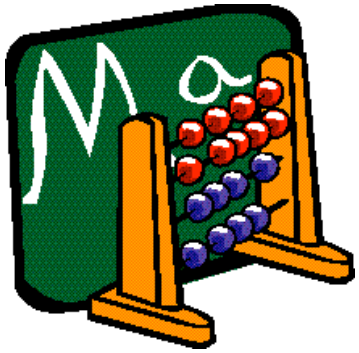
THIRD GRADE
Number and Number Sense



Abacus Action

Format: Whole class

SOL Objectives:
3.1 The student will read and write six-digit numerals and identify the place value for each digit.
3.2 The student will round a whole number, 9,999 or less, to the nearest ten, hundred, and thousand.

Related SOL: 1.1, 1.2, 1.4, 2.1, 2.2, 4.1a, 4.1c

Vocabulary: *ones, tens, hundreds, thousands, ten thousands, hundred thousands, place value, rounding, whole number, digits, period*

Materials: *The Warlord's Beads*, by Virginia Walton Pilegard; wooden board with nails and beads to serve as abacus

Time Required: 45 minutes to 1 hour

Directions:
1. Read *The Warlord's Beads* to the class. Tell students that they will be using an abacus similar to the one that Chaun created. Explain that an abacus is a tool they will use for counting, building, reading, and writing numbers.
2. Give each student a wooden base and a set of beads. Allow time for the students to experiment with placing beads on the nails. Ask, "How many beads fit on any one nail?" *(9)*
3. Ask the students to put a finger on the ones place (first nail on the left). Check for understanding before moving on. Do the same for the tens, hundreds, thousands, ten thousands, and hundred thousands places.
4. Begin building numbers on the abacus. Place five beads in the ones place and ask students to do the same. Ask them to read the number and then write the number on individual white boards or paper. Continue with other (larger) numbers until the students are comfortable with using the abacus to represent any number up to 999,999. As you build different numbers, ask students to identify digits (and their values) in particular place value positions.
5. Have students build numbers given clues such as the following:
   Example 1
   - This number has a 6 in the tens place.
   - The digit in the ones place is two more than the digit in the tens place.
   - The digit in the hundreds place is an odd number greater than 7. *(968)*

   Example 2
   - This number is more than 51,000 but less than 52,000.
   - The digit in the hundreds place is the sum of 4 and 5.
   - The tens place is worth 80.
   - The digit in the ones place is an even number more than 7. *(51,988)*
6. Practice rounding numbers by having students build a given number on the abacus and then round that number to the nearest ten, hundred, or thousand. Have students use the physical model to explain the rounding process.

Exploration Questions:

- What is the value of a digit in a particular place?
- What happens when there are no beads in a given place? How would you write that number? (Be sure students are including the zero in the number.)
- Have students show 2,049. What happens when you add 3?
- What are different ways to read and write 41 (e.g., 4 tens and 1 one or 41 ones)?
- Given the number 473, is this the largest number you can make with these digits? Can you make a smaller number? What is this number in expanded form?

Build the Number

Format: Whole class

SOL Objectives:
3.1 The student will read and write six-digit numerals and identify the place value for each digit.
3.2 The student will round a whole number, 9,999 or less, to the nearest ten, hundred, and thousand.

Related SOL: 1.1, 1.2, 1.4, 2.1, 2.2, 4.1a, 4.1c

Vocabulary: *ones*, *tens*, *hundreds*, *thousands*, *ten thousands*, *hundred thousands*, *place value*, *rounding*, *digit*, *whole number*, *period*

Materials: Place-value mat and cards 0–9 (which can be found in Virginia Standards of Learning Enhanced Scope and Sequence, http://www.doe.virginia.gov/VDOE/EnhancedSandS/mathematics.shtml, pages 4 & 6); overhead projector; overhead transparency with number word written on it, white boards or paper for each student

Time Required: 45 minutes to 1 hour

Directions:
1. Introduce activity by reviewing place-value mat and the terms of each period (i.e., ones, tens, hundreds).
2. Write a number word (e.g., three hundred fifty-two) on the overhead transparency.
3. Students should use their cards to show the numerical value of the number word.
4. Circulate around the room, monitoring student answers.
5. After giving students several examples, increase number values to include numbers up to the hundred thousands place. For example, have students write "nine hundred forty-five thousand, sixty-one."
6. You may substitute place-value mat and cards 0–9 with place value cards.

Exploration Questions:
- What happens when there is not a number written for the hundreds place? How do you write that? Give the example, "nine hundred forty-five thousand, sixty-one" (945,061). Remind students that they will put a zero in the hundreds place to represent no hundreds in this number.

Variations:
- Refer to the "*Build the Bigger Number"* activity in the Virginia Standards of Learning Enhanced Scope and Sequence, http://www.doe.virginia.gov/VDOE/EnhancedSandS/mathematics.shtml.
- Build a bigger number.
- Build the smallest number.

People Fractions

Format: Whole class

SOL Objectives:

3.5 The student will divide regions and sets to represent a fraction; and name and write fractions represented by a given model (area/region, length/measurement, and set). Fractions (including mixed numbers) will include halves, thirds, fourths, eighths, and tenths.

Related SOL: 1.6, 2.4, 4.2, 5.2a

Vocabulary: *halves*, *thirds*, *fourths*, *fifths*, *sixths*, *eighths*, *tenths*

Materials: *Five Creatures*, by Emily Jenkins, Tomasz Bogacki, and Tomek Bogacki; two construction paper squares; scissors

Time Required: 20 to 30 minutes

Directions:

1. Read *Five Creatures* to the class. Relate the family in the story to fractions, using the five creatures in the house as a set model for a whole. Ask, "What fraction of the creatures in the house likes to eat mice?"
2. Ask for six volunteers to go to the front of the room to serve as a whole group. Ask the students to find fractions that politely describe parts of the whole group (e.g., two-sixths of the students are wearing tennis shoes). When appropriate, show reduced fractions by having students group themselves accordingly. For example, if two-sixths of the students have tennis shoes, ask students to arrange their groupings to demonstrate that one-third of the students are wearing tennis shoes (e.g., have all the students pair up to show three groups within the whole). Repeat this activity, allowing students to model and identify other fractions within the group.
3. Show the class two squares. Ask the students to describe the squares, making sure that they recognize that the squares are congruent. Cut one square in half vertically and the other square in half on the diagonal. Tell students to imagine the squares are granola bars. Ask, "Which piece would you like to have?" Discuss students' answers.

Picture Parts

Format: Whole class

SOL Objectives:

3.5 Divide regions and sets to represent a fraction; and name and write the fractions represented by a given model (area/region, length/measurement, and set). Fractions (including mixed numbers) will include halves, thirds, fourths, eighths, and tenths.

3.6 Compare the numerical value of two fractions having like and unlike denominators, using concrete or pictorial models involving areas/regions, lengths/measurements, and sets.

Related SOL: 1.6, 2.4, 4.2, 4.3, 5.2

Vocabulary: *Fraction*, *halves*, *thirds*, *fourths*, *eighths*, *tenths*,

Materials: *Picture Pie, A Circle Drawing Book*, by Ed Emberley; glue, scissors, construction paper; construction paper pattern blocks (see *Something Fishy* lesson in the Virginia Standards of Learning Enhanced Scope and Sequence, http://www.doe.virginia.gov/VDOE/EnhancedSandS/mathematics.shtml). You can draw a line perpendicular to the bases on the trapezoids to create two equal-sized smaller pieces, so that you also have fourths when the hexagon is a whole. Use a different color for that page.)

Time Required: 45 minutes to 1 hour

Directions:

1. Read *Picture Pie, A Circle Drawing Book* to the students.
2. Have students discuss the different parts of the whole when the circle is the whole.
3. Next, give each student a set of construction paper pattern blocks.
4. Tell the students that the hexagon is a whole. Ask them to hold up the piece or pieces that are equal to one-half.
5. Ask if they see more than one solution. Ask them to hold up the piece or pieces that are equal to one-third, one-fourth, and one-eighth, if possible.
6. Next, tell the students that the trapezoid is the whole. Again, they should hold up the piece or pieces that are equal to one-half, one-third, two-thirds, and so forth. Ask, "What is the trapezoid equal to?"
7. Change the whole to the triangle and repeat the steps above.
8. After discussing the different parts, have students create a picture using 15 or fewer pattern blocks.
9. Ask students to consider that if the hexagon is the whole, how many halves do they have, how many thirds, how many fourths? (They can use the back of their paper to answer the questions.)

Variations:

- When the students hold up the different pieces to show halves, ask the student who is holding up three triangles, "What fraction is that?" Another student may be holding up the two equal pieces that make the trapezoid; ask that student if he or she can identify two-fourths and three-sixths.

Place Value Sense

Format: Whole class, partners

SOL Objectives:
3.7 The student will read and write decimals expressed as tenths and hundredths, using concrete materials and models.

Related SOL: 4.4, 5.1

Vocabulary: *tenths*, *hundredths*

Materials: Models of ones, tenths, and hundredths, using 10 x 10 squares

Time Required: 20 to 30 minutes

Directions:
Students should have seen several models of tenths and hundredths prior to this lesson.
1. Divide students into pairs.
2. Write a number on the board, such as 0.56.
3. Ask the students to say the number to a partner.
4. Have one student say it out loud.
5. Then write another number, such as 5.6.
6. Ask students to say the number to a partner. Ask, "What has changed? Which number is bigger?"
7. Ask students to draw a picture of the two numbers using blank 10 x 10 squares.
8. Say another number to the class, such as 2.37.
9. Ask the students to write the number on paper and then compare it with what their partners wrote. Have one of the students write the number on the board.
10. Ask students to draw a picture of the number.
11. Ask them to write a number that is one-tenth larger. Ask, "What is that number?"
12. Ask students to write a number that is one-hundredth smaller. Ask, "What is that number?"
13. Have students say the number to their partners, and then draw a picture of it.
14. Next, ask them to write 0.49 in as many different ways as they can. For example, 0.1 + 0.1 + 0.1 + 0.1 + 0.09 or 0.4 + 0.09, or 4 tenths and 9 hundredths. Have them write all of these ideas on the board.

Yes or No, What's My Number?

Format: Whole class

SOL Objectives:

3.3 The student will compare two whole numbers between 0 and 9,999, using symbols (>, <, or =) and words (*greater than, less than,* or *equal to).*

Related SOL: 2.2, 4.1, 5.1

Vocabulary: *greater than*, *less than* or *equal*

Materials: A sticker for each student with a number on it between 0 and 9,999

Time Required: 30 to 45 minutes

Directions:

1. Put a number between 0 and 9,999 on the back of each student's shirt, using a sticker. Have students walk around the room and ask a classmate one question: "Is my number greater than, less than, or equal to number _____?" Students will need to continue walking around the room and asking other classmates the question (varying the number) until determining the number on the sticker. Students have the option of carrying a folder or clipboard with a piece of paper to write down their questions, and answers received. Check to see their notations.
2. When a student deduces his/her number, he/she can move the sticker to the front of his/her shirt. She/he can continue to answer questions for other students who have not figured out their numbers. Play continues until everyone knows their numbers.
3. Next, ask the students to line up around the room from least to greatest, based on their numbers.
4. At the end of the lesson, ask the students to explain their methods for eliminating choices and arriving at their numbers. Did they have a strategy?

Variations:

- Check to see what types of notations the students are using on their papers as they circulate. If they use words, ask if they can use symbols; if they use symbols, ask if they can put their notation in words.
- Evaluate the questions that they ask. Are they just guessing, or are they using some type of strategy to eliminate certain choices?
- Have the students share their ideas as a group.

100s Chart Activities

Format: Whole class

SOL Objectives:
3.1 The student will read and write six-digit numerals and identify the place value for each digit.
3.8 The student will solve problems involving the sum or difference of two whole numbers, each 9,999 or less, with or without regrouping, using various computational methods, including calculators, paper and pencil, mental computation, and estimation.

Related SOL: 1.1, 1.2, 1.4, 2.1, 2.2, 4.1a, 4.1c

Vocabulary: *ones*, *tens*, *hundreds*, *thousands*, *ten thousands*, *hundred thousands*, *place value*, *rounding*, *digit*, *whole number*, *period*, *product*, *one more*, *ten more*, *one less*, *ten less, descending order*

Materials: 100s charts: (1 to 100 board and 0 to 99 board); counters for 100s chart

Time Required: 45 minutes

Directions:
1. Give each student a 100s chart and a counter.
2. Practice by having students put a counter (or a finger) on a number on the 100s chart (34, for example). Tell them to add 10. Ask, "What is the sum?" *(44)* Make sure students understand that adding 10 to 34 requires moving down one space on the 100s chart. *(Students usually will learn that they just need to move down one space when adding 10, instead of counting one by one.)*
3. Try another example *(56)*. Ask students to add 10 *(66)*. Again, students should move their counters down one space on the 100s chart. Do as many examples as necessary until all students can successfully complete the task.
4. Next, have students place a counter on 72, and then subtract 10. Tell students to note that their counters move up one space because they are subtracting, not adding. Practice several subtraction examples.
5. Try adding 11. Tell students to place a counter on 24, and then add 11. Students should move finger down one space to make 10 and then one space to the right, indicating that 11 is the same as 10 + 1. Try more examples until students grasp the concept.
6. Move to a subtraction example. Ask students to put a counter on 89, and then subtract 11. Students should move up one space to represent minus 10, and then move one to the left to subtract 1, arriving at the answer of 78.
7. Students should now be ready to play the following games. As you play each game, you'll see students getting faster at adding and subtracting once they understand how to manipulate (decompose numbers on) the 100s chart.

Game One

Directions:

1. Tell students that you're thinking of a number on the 100s chart. Offer clues to help students identify the number.
2. Ask students to place their counters on the *sum* of 11 and 7. Have them check with a neighbor to make sure everyone is starting on the same number *(18)*.
3. Add 20. *(Monitor students to check if they move their counters down two spaces to add 20, arriving at the sum of 38.)*
4. Subtract 2. Ask, "Where are you now? Are you on a multiple of 6?"
5. Subtract 10, and then subtract 1. Ask, "Is your number the same as the number of pennies in a quarter?" *(yes, 25)*
6. Add 9. *(You may notice students adding 10 and then subtracting 1.)*
7. Add 11. Ask, "Are you on a *multiple* of 5?" *(yes, 45)*
8. Subtract 2, and add 21. Ask, "Is the *sum* of the digits 10?" *(yes, 64)*
9. Add 31, and then subtract 10.
10. Add 1, and then subtract 20. Ask, "Are both *digits* the same?" *(yes)*
11. Ask students: "What's my number?" *(66)*

Game Two

Directions:

1. Instruct students to place a counter on the *product* of 11 and 7. Have them check with a neighbor to make sure everyone is starting on the same number *(77)*.
2. Add 20, and then subtract 2. Ask, "Are you on a *multiple* of 5?" *(yes, 95)*
3. Subtract 10, and then subtract 1. Ask, "Is the tens place *double* the ones place?" *(yes, 84)*
4. Add 9, and then subtract 30. Ask, "Is the number a *multiple* of 3?" *(yes, 63)*
5. Subtract 2, and then add 21. Ask, "Is the *sum* of the digits 10?" *(yes, 82)*
6. Subtract 31 and add 10.
7. Add 1 and then subtract 18. Ask, "Are both *digits* the same?" *(yes)*
8. Ask, "What's my number?" *(44)*

Game Three

Directions:

1. Instruct students to place a counter on the *product* of 5 and 7. (Ask students to answer aloud, so that everyone starts on the same number, 35).
2. Subtract 3. Add 11. Ask, "Are the digits in consecutive *descending order*?" *(yes, 43)*
3. Add 12, and then add 9.
4. Subtract 1. Ask, "Is the tens place double the ones place?" *(yes, 63)*
5. Subtract 9, and then add 1.
6. Add 20. Ask, "Is this the amount of change you would get from $1, after making a 25-cent purchase? *(yes, 75 cents)*
7. Subtract 3, and then add 9. Ask, "Is this number a *multiple* of 9?" *(yes, 81)*
8. Subtract 29. Ask, "Is the *sum* of the digits 7?" *(yes)*
9. Ask, "What's my number?" *(52)*

Exploration Questions:

- What happens to a number when you go up one space? *(increases by 10)*
- What happens to a number when you go down one space? *(decreases by 10)*
- How can you write 11? *(10 + 1)* How do you show that number on the 100s chart? *(move up one and over one)*
- What other patterns did you notice when using the chart?

Variations:

- Use a 200s chart
- Refer to *Nimble With Numbers: Engaging Math Experiences to Enhance Number Sense and Promote Practice*, by Leigh Childs, Laura Choate, Karen Kenkins.

Place Value Hula Hoop Race

Format: Whole class

SOL Objectives:
3.1 The student will read and write six-digit numerals and identify the place value for each digit.
3.7 The student will read and write decimals expressed as tenths and hundredths, using concrete materials and models.

Related SOL: 4.4, 5.1

Vocabulary: *ones*, *tens*, *hundreds*, *thousands*, *ten thousands*, *hundred thousands*, *place value*, *whole number*, *digits*, *period*

Materials: Number cards (15 to 20 cards written numerically and 15 to 20 cards written with word names); two Hula Hoops

Time Required: 20 minutes

Directions:
1. Place Hula Hoops on the floor on one side of the room.
2. Spread half of the numeric cards and their corresponding word name cards in one hoop. Place second set in the other hoop.
3. Divide students into two teams lined up at the opposite end of the classroom from the Hula Hoops.
4. On your signal, the first student in each line races down to the Hula Hoops and finds a set of matching cards (one number card and its corresponding word name card). The students race back with the cards and place them on the floor near their line.
5. Quickly check to see if the card set is correctly matched. If it is, allow the next student in line to go. If it's not correct, quickly place the card set back in the Hula Hoop, as you signal the next student in that line to go.
6. Play continues until one team's Hula Hoop is empty, and the team has successfully matched all of its numeric cards with the corresponding word name cards.

Variations:
- Use decimal number cards and decimal word name cards. For example, write 2.61 on one card and two and sixty-one hundredths on a corresponding card.

Sample Number Cards

135	**One hundred thirty-five**
204	**Two hundred four**
35	**Thirty-five**
44,651	**Forty-four thousand, six hundred fifty-one**
12,044	**Twelve thousand, forty-four**
990	**Nine hundred ninety**
635,002	**Six hundred thirty-five thousand, two**
18,405	**Eighteen thousand, four hundred five**
62,091	**Sixty-two thousand, ninety-one**
18	**Eighteen**

Place Value Paths

Format: Whole class or small group

SOL Objectives:
3.1 The student will read and write six-digit numerals and identify the place value for each digit.

Related SOL: 2.1, 4.1, 5.1

Vocabulary: *more than*, *less than*, *add*, *sum*, *subtract*, *difference*, *ones*, *tens*, *digits*, *double*, *multiple of*

Materials: 100s chart; two sets of digit cards; place-value paths recording sheet for each student

Time Required: 30 to 45 minutes

Directions:
1. Mix the two sets of digit cards together and stack them facedown.
2. Draw two cards and announce the digits to the class. Ask, "What numbers can be formed using these digits?" *(Example: 5 and 6 are drawn, thus the number choices are 56 and 65.)*
3. Each player selects one of the digits. Remind students that their place-value paths ultimately must contain six two-digit numbers, ordered from smallest to greatest. The six two-digit numbers need to touch. After six numbers, continue drawing numbers to reach both ends of chart.
4. Instruct students to independently record their number choices in one of the cells along the place-value path. If students cannot place either of the possible numbers in any of their remaining cells, nothing is recorded.
5. After six draws, ask whether any students have completed their entire place-value path. Draws continue until the majority of students have completed paths. Ask the students to compare their results.

Exploration Questions:
- How did you decide where to place your numbers?
- How do your paths differ from others in class?

Variations:
- Use three cards per draw.
- Use a 200s chart.

Place Value Roll

Format: Pairs or small groups

SOL Objectives:
3.1 The student will read and write six-digit numerals and identify the place value for each digit.
3.8 The student will solve problems involving the sum or difference of two whole numbers, each 9,999 or less, with or without regrouping, using various computational methods, including calculators, paper and pencil, mental computation, and estimation.

Related SOL: 1.1, 1.2, 1.4, 2.1, 2.2, 4.1a, 4.1b

Vocabulary: *ones*, *tens*, *place value*, *digit*, *whole number*, *period*, *adding*, *subtracting*, *sum*, *difference*

Materials: Place-value roll chart (100s chart, 99 chart, or 200s chart); number cubes; cover disks

Time Required: 20 minutes

Directions:
1. Instruct the starting player to roll the number cubes and add the numbers on the top faces. Students should then cover that number on the chart. *(Example: If one cube is 3, and the other cube is 4, students would then cover the number 7.)*
2. The next player rolls the number cubes, and the process repeats.
3. On the starting player's second turn, he or she rolls the number cubes and adds the total to the sum rolled on the first turn. (To score totals greater than 10, the player can use two number cubes.)
4. Have players alternate turns until one player reaches 99 or higher.

Exploration Questions:
- What methods did you use to add? *(add on, double, estimate, paper and pencil)*
- How could you check your answers? *(paper and pencil, calculator, subtraction)*

Variations:
- Give each pair a calculator to check answers in the beginning. Or, assign a third student to check answers.
- Refer to *Nimble With Numbers: Engaging Math Experiences to Enhance Number Sense and Promote Practice*, by Leigh Childs, Laura Choate, Karen Kenkins.
- Start at 99, and subtract the roll value of the number cubes instead of adding. The first player to reach zero wins.
- Use a six- or 12-sided die.
- Use three number cubes on a 200s chart.

Rounding It

Format: Whole class

SOL Objectives:
3.1 The student will read and write six-digit numerals and identify the place value for each digit.
3.2 The student will round a whole number, 9,999 or less, to the nearest ten, hundred, and thousand.

Related SOL: 1.1, 1.2, 1.4, 2.1, 2.2, 4.1a, 4.1c, 5.1a, 5.1b

Vocabulary: *ones*, *tens*, *hundreds*, *thousands*, *ten thousands*, *hundred thousands*, *place value*, *rounding*, *whole number*, *digits*, *period*

Materials: Spinner board and spinner (e.g., pencil or paper clip); recording sheet for each student; base-10 blocks

Time Required: 20 to 30 minutes

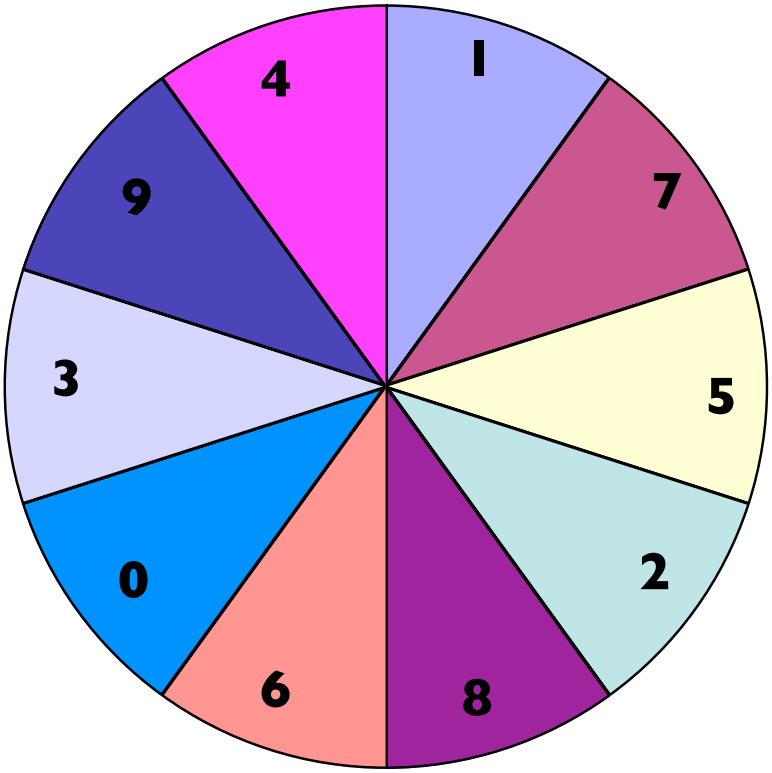
Directions:
Practice instructions: Have students practice rounding numbers by building a given number with base-10 blocks and then rounding that number to the nearest ten, hundred, or thousand. Have students use the physical models (base-10 blocks or a number line) to explain the rounding process.

1. Instruct students to take turns spinning the spinner to create a two-, three-, or four-digit number, according to the instructions on the recording sheet.
2. Have students write each number on the recording sheet as they spin it. It will take two, three, or four spins to create the numbers.
3. After students complete the number, ask them to round it to the nearest ten, hundred, or thousand, following the recording sheet instructions.
4. Students should write the rounded number on the recording sheet.

Exploration Questions:
- What is the value of a digit in a particular place?
- What happens when there isn't a number in a place? How do you write that number? Are you including the zero in the number?

Variations:
- Have students work with the number 2,549, exploring what happens when it's rounded to the nearest ten, hundred, and thousand. Students should compare their answers.

Spinner



Rounding It Recording Sheet

Name: _____

Number of Digits	Number Made	Round to the Nearest ____	Rounded Number
Sample 3	247	Ten	250
2		Ten	
2		Ten	
2		Ten	
3		Ten	
3		Hundred	
3		Hundred	
4		Thousand	
4		Hundred	
4		Hundred	
4		Thousand	